

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 21 June 2000 (21.06.00)	
International application No. PCT/KR99/00595	Applicant's or agent's file reference P01064DP
International filing date (day/month/year) 30 September 1999 (30.09.99)	Priority date (day/month/year) 01 October 1998 (01.10.98)
Applicant KIM, Deok, Woo	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

10 April 2000 (10.04.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election
- ☒
- was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Olivia RANAIVOJAONA
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

PARK, Lae, Bong
1F., Dongun B/D
413-4, Dogok 2-dong
Kangnam-gu
Seoul 135-272
RÉPUBLIQUE DE CORÉE

RECEIVED

JUL 10 2001

Technology Center 2600

Date of mailing (day/month/year) 19 March 2001 (19.03.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference P01064DP	
International application No. PCT/KR99/00595	International filing date (day/month/year) 30 September 1999 (30.09.99)

1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

Name and Address

PARK, Lae, Bong
4F TLBS B/D
464-1, Kunja-dong
Kwangjin-gu
Seoul 143-150
Republic of Korea

State of Nationality

State of Residence

Telephone No.

02 498 9585

Facsimile No.

02 498 5758

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☐ the name ☒ the address ☐ the nationality ☐ the residence

Name and Address

PARK, Lae, Bong
1F., Dongun B/D
413-4, Dogok 2-dong
Kangnam-gu
Seoul 135-272
Republic of Korea

State of Nationality

State of Residence

Telephone No.

82-2-529-4635

Facsimile No.

82-2-529-4636

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office ☐ the designated Offices concerned
☐ the International Searching Authority ☒ the elected Offices concerned
☒ the International Preliminary Examining Authority ☐ other:

<p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No.: (41-22) 740.14.35</p>	<p>Authorized officer</p> <p>I. Britel</p> <p>Telephone No.: (41-22) 338.83.38</p>
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PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum)

P01064DP

Box No. I TITLE OF INVENTION

MOBILE PHONE SYSTEM AND MOBILE PHONE TERMINAL USING A PLURALITY OF TELEPHONE NUMBERS

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

WOORIGISOOL Inc.
1595-1, Bongchun 7-dong, Kwanak-gu,
Seoul 151-057, Republic of Korea

☐ This person is also inventor.

Telephone No. 02) 886-0351

Facsimile No. 02) 886-8560

Teleprinter No.

State (that is, country) of nationality:

KR

State (that is, country) of residence:

KR

This person is applicant for the purposes of:

☐

all designated States

☒

all designated States except the United States of America

☐

the United States of America only

☐

the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

KIM, Deok Woo
102-1303 Sungwon Apt., 4-ga, Yangpyong-dong,
Youngdeungpo-gu, Seoul, 151-051,
Republic of Korea

This person is:

☐ applicant only☒ applicant and inventor☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

KR

State (that is, country) of residence:

KR

This person is applicant for the purposes of:

☐

all designated States

☐

all designated States except the United States of America

☒

the United States of America only

☐

the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒

agent

☐

common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

PARK, Lae Bong
4F TLBS B/D 464-1, Kunja-dong, Kwangjin-gu,
Seoul, 143-150, Republic of Korea

Telephone No. 02) 498-9585

Facsimile No. 02) 498-5758

Teleprinter No.

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent

Box No. V DESIGNATION STATES

The following designation is hereby made under Rule 4.9(a) (mark the appropriate check-boxes; at least one must be marked):

Regional Patent

- ☐ AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|---|---|
| <input type="checkbox"/> AL Albania | <input type="checkbox"/> LS Lesotho |
| <input type="checkbox"/> AM Armenia | <input type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AU Australia | <input type="checkbox"/> LV Latvia |
| <input type="checkbox"/> AZ Azerbaijan | <input type="checkbox"/> MD Republic of Moldova |
| <input type="checkbox"/> BA Bosnia and Herzegovina | <input type="checkbox"/> MG Madagascar |
| <input type="checkbox"/> BB Barbados | <input type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input type="checkbox"/> BG Bulgaria | <input type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BR Brazil | <input type="checkbox"/> MW Malawi |
| <input type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> NO Norway |
| <input type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> PL Poland |
| <input type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> PT Portugal |
| <input type="checkbox"/> CZ Czech Republic | <input type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> DE Germany | <input type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DK Denmark | <input type="checkbox"/> SD Sudan |
| <input type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> FI Finland | <input type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> GB United Kingdom | <input type="checkbox"/> SK Slovakia |
| <input type="checkbox"/> GD Grenada | <input type="checkbox"/> SL Sierra Leone |
| <input type="checkbox"/> GE Georgia | <input type="checkbox"/> TJ Tajikistan |
| <input type="checkbox"/> GH Ghana | <input type="checkbox"/> TM Turkmenistan |
| <input type="checkbox"/> GM Gambia | <input type="checkbox"/> TR Turkey |
| <input type="checkbox"/> HR Croatia | <input type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> HU Hungary | <input type="checkbox"/> UA Ukraine |
| <input type="checkbox"/> ID Indonesia | <input type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> US United States of America |
| <input type="checkbox"/> IN India | <input type="checkbox"/> UZ Uzbekistan |
| <input type="checkbox"/> IS Iceland | <input type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> JP Japan | <input type="checkbox"/> YU Yugoslavia |
| <input type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input type="checkbox"/> KG Kyrgyzstan | |
| <input type="checkbox"/> KP Democratic People's Republic of Korea | |
| <input type="checkbox"/> KR Republic of Korea | |
| <input type="checkbox"/> KZ Kazakhstan | |
| <input type="checkbox"/> LC Saint Lucia | |
| <input type="checkbox"/> LK Sri Lanka | |
| <input type="checkbox"/> LR Liberia | |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit)

Box No. VI PRIORITY CLAIM

☐ Full priority claims are indicated in the Supplemental Box.

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 01 October 1998 (01/10/98)	98-41936	KR		
item (2)				
item (3)				

☐ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s):

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA)
(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA / AT

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year)

Number

Country (or regional Office)

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following number of sheets:

request : 3
description (excluding sequence listing part) : 29
claims : 14
abstract : 1
drawings : 10
sequence listing part of description : _____

Total number of sheets : 57

This international application is accompanied by the item(s) marked below:

- ☐ fee calculation sheet
- ☒ separate signed power of attorney
- ☐ copy of general power of attorney; reference number, if any:
- ☐ statement explaining lack of signature
- ☐ priority document(s) identified in Box No. VI as item(s):
- ☐ translation of international application into (language):
- ☐ separate indications concerning deposited microorganism or other biological material
- ☐ nucleotide and/or amino acid sequence listing in computer readable form
- ☐ other (specify):

Figure of the drawings which should accompany the abstract: Fig. 2

Language of filing of the international application: English

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request)

PARK, Lae Bong

1. Date of actual receipt of the purported international application:		For receiving Office use only		2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:				
4. Date of timely receipt of the required corrections under PCT Article 11(2):				
5. International Searching Authority (if two or more are competent): ISA /		6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.		

Date of receipt of the record copy by the International Bureau:

For International Bureau use only

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

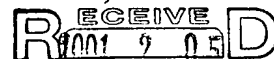
To:

Park, Lae Bong
4F TLBS B/D 464-1,
Kunja-Dong,
KwangJin-Gu,
Seoul, 143-150
Republic of Korea

PCT

WRITTEN OPINION

(PCT Rule 66)



Date of mailing (day/month/year)	24 January 2001 (24.01.2001)
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Applicant's or agent's file reference

P01064DP

REPLY DUE

within 1 months/days from
the above date of mailing

International application No.
PCT/KR 99/00595

International filing date (day/month/year)
30 September 1999 (30.09.1999)

Priority date (day/month/year)
1 October 1998 (01.10.1998)

International Patent Classification (IPC) or both national classification and IPC
IPC⁷: H 04 Q 7/38, H 04 M 3/436, H 04 M 3/53

Applicant

WOORIGISOOL INC. et al.

1. This written opinion is the first (first, etc.) drawn by this International Preliminary Examining Authority.
2. This opinion contains indications relating to the following items:
 - I. ☒ Basis of the opinion
 - II. ☐ Priority
 - III. ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV. ☒ Lack of unity of invention
 - V. ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability: citations and explanations supporting such statement
 - VI. ☐ Certain documents cited
 - VII. ☒ Certain defects in the international application
 - VIII. ☐ Certain observations on the international application
3. The applicant is hereby invited to reply to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.
4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 1 February 2001 (01.02.2001).

Name and mailing address of the IPEA/AT
Austrian Patent Office
Kohlmarkt 8-10; A-1014 Vienna

Authorized officer

LOIBNER

Facsimile No. 1/53424/200

Telephone No. 1/53424/323

Form PCT/IPEA/408 (cover sheet) (July 1998)

I. Basis of the opinion

1. With regard to the **elements** of the international application:*

☒ the international application as originally filed

☐ the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the claims:

pages _____, as originally filed
pages _____, as amended (together with any statement) under Article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the drawings:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation: furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:

☐ contained in the international application in printed form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This opinion has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".

IV. Lack of unity of invention

1. In response to the invitation (Form PCT/IPEA/405) to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
☐ paid additional fees.
☐ paid additional fees under protest.
☐ neither restricted nor paid additional fees.

2. This Authority found that the requirement of unity of invention is not complied with for the following reasons and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees:

Group I, Claims 1-11, drawn to a mobile phone terminal using a plurality of telephone numbers to provide different incoming call alerting (arrival sound, vibration, LED) and to display call arrival characters which will depend upon extracted phone number identification information or extracted phone terminal identification information.

Group II, Claims 12-35, drawn to call responding methods of a mobile phone and of a mobile switching node with corresponding mobile phone system and voice mailing method.

The inventions listed as Groups I and II do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The special technical feature of Group I invention is the mobile phone terminal and the special technical feature of Group II is related to call responding methods of a mobile phone and of a mobile switching node with corresponding mobile phone system and voice mailing method.

Since the special technical feature of Group I invention is not present in the Group II claims and the special technical feature of Group II invention is not present in Group I claims, unity of invention is lacking.

3. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this opinion:

- ☒ all parts.
☐ the parts relating to claims Nos. _____

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	4, 5, 9, 10, 12-35 ✓	YES
	Claims	1-3, 6-8, 11	NO
Inventive step (IS)	Claims	12-19, 23-35 ✓	YES
	Claims	1-11, 20-22	NO
Industrial applicability (IA)	Claims	1-35	YES
	Claims		NO

2. Citations and explanations

The following documents have been cited in the search report:

D1 EP 0 647 075 A2
D2 GB 2 314 185 A
D3 WO 94/29992 A1
D4 GB 2 296 409 A

D1 discloses a system and method that provides notification of information relating to an incoming call to a called wireless communication device to which multiple directory numbers have been assigned. The invention comprises a system and method for delivering the terminating called party identification (TCLID) to the called wireless communication device during paging of the called wireless communication device. The TCLID is used to display the called directory number on the display of the wireless communication device or to generate an audible incoming call alert that can indicate each of the plurality of directory numbers that have been assigned by a different sound. The called wireless communication device uses a unique physical device address. A look-up table at the wireless communication switch is provided to relate the multiple directory numbers to single physical device addresses of the wireless communication devices.

D2 discloses a selective calling receiver detecting whether a received calling number matches the selective calling number stored in the pager and further detecting a code included in the received message accompanying said selective calling number and judging whether the received code is the same as a predetermined code and displaying a predetermined message assigned to said code together with parts of the received message and finally generating at least one of audible, tactile or visual alert-signal which corresponds to said code.

The subject matter of Claim 1-3, 6-8 and 11 of the present application lacks novelty as being anticipated by D1.

The features according to dependent Claims 4, 5, 9 and 10 have already been employed for the same reason in a selective calling receiver, which is disclosed in the document D2. It appears to be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these known features with the corresponding effect to the wireless communication device according

Supplemental Box III

(To be used when the space in any of the preceding boxes is not sufficient)

(Continuation of Box V.2)

to document D1 and thus to arrive at a mobile phone terminal with the feature of vibrating differently or displaying a LED differently depending on the extracted identification information during connection request. Consequently, the subject matter of Claims 4, 5, 9 and 10 does not meet the requirements of PCT Article 33(3).

D3 discloses a method of providing call screening to a subscriber of personal communication services which facilitates the screening of incoming calls by associating the number dialled by a calling party with a function or role of the dialled number. This function or role is then sent to the subscriber when an incoming call is received. This way, the subscriber can decide whether to answer the incoming call based upon knowing the role or context associated with the dialled number. The subscriber is also provided with user controlled features which can be invoked by the use of DTMF codes. The subscriber can place a calling party on hold prior to answering the incoming call. In addition, the subscriber can proceed with a call transfer from a wireless telephone to a wired telephone and vice-versa, while the call is still in progress. Another feature allows the subscriber to implement a real-time call screening, while the calling party is leaving a message on voice mail.

With respect to D3 the solution proposed in Claims 20-22 of the present application cannot be considered as involving an inventive step according to the requirements of PCT Article 33 (3) because it is known to the person skilled in the art that feature "phone number identification information corresponding a called telephone" is an equivalent to the feature "function or role associated with the number dialled by the calling party" of document D3 and can be interchanged with that feature where circumstances make it desirable.

Document D4 is directed to a mobile telephone provided with two or more telephone numbers. D4 also relates to origination and termination of calls using each of these telephone numbers under the condition that a pre-set day and time or area condition must be met. However D4 more relates to outgoing call management than to incoming call management. D4 fails to show the feature that an incoming call request is selectively rejected when a particular condition is not met. Consequently D4 merely define the state of the art and cannot to be considered to be of particular relevance.

The capability of industrial application is obviously given for all claims of the present application.

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

page 15, line 22: reference number 21 should be corrected to 31.

page 16, line 24: term "microphone 37" should be corrected to "speaker 37", as an alerting device is obviously an output device.

page 24, line 5: reference number S87 should be corrected to S88.

figure 7A: step S85 (action), step S89 (yes/no branches) and S90 (action) are misleading with respect to the description.

figure 7B: labels of reference numbers S100, S103 and S107 should be corrected to read without line break.

PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To:

PARK, Lae, Bong
4F TLBS B/D
464-1, Kunja-dong
Kwangjin-gu
Seoul 143-150
RÉPUBLIQUE DE CORÉERECEIVED
2000. 4. 24

Date of mailing (day/month/year) 13 April 2000 (13.04.00)		IMPORTANT NOTICE	
Applicant's or agent's file reference P01064DP			
International application No. PCT/KR99/00595	International filing date (day/month/year) 30 September 1999 (30.09.99)	Priority date (day/month/year) 01 October 1998 (01.10.98)	
Applicant WOORIGISOOL INC. et al			

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
AU,CN,JP,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AT,BR,CA,DE,DK,EA,EP,ES,FI,GB,HU,IL,LU,MX,NO,PL,PT,SE,SG

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on
13 April 2000 (13.04.00) under No. WO 00/21306

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

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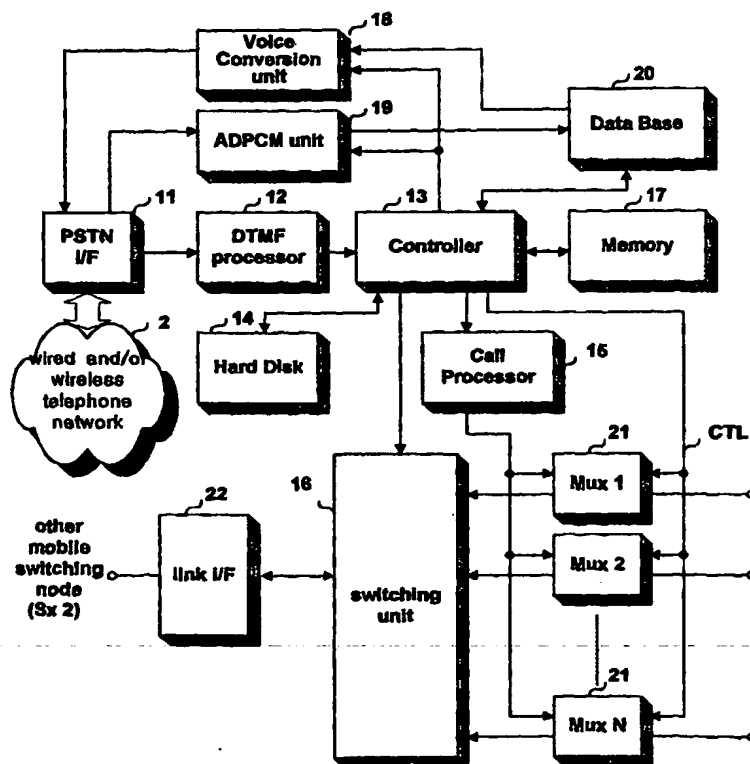
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(54) Title: MOBILE PHONE SYSTEM AND MOBILE PHONE TERMINAL USING A PLURALITY OF TELEPHONE NUMBERS

(57) Abstract

The present invention relates to a mobile phone system and a terminal which assign a plurality of telephone numbers to single mobile phone. Suppose that there received a call request signal via a telephone interface unit 11. A controller 13 in mobile switching node searches for a phone terminal identification information corresponding to a called telephone number contained in the call request signal and checks whether a called mobile phone terminal uses a plurality of telephone numbers or not. If the controller 13 discovers the corresponding phone terminal identification information, it also extracts a phone number identification information associated with the called telephone number, and then corresponding call processing is performed based on the phone number identification number. Meanwhile, a mobile phone terminal extracts a phone terminal identification information contained in the call connection request signal received from mobile switching node and checks if the call connection request is for itself. If then, a phone number identification information, contained in the call connection request signal is extracted to enable a callee to recognize which telephone number is called among multiple phone numbers assigned.



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DESCRIPTION

MOBILE PHONE SYSTEM AND MOBILE PHONE TERMINAL USING A PLURALITY OF TELEPHONE NUMBERS

1. Technical Field

5 The present invention relates to a mobile phone system and mobile phone terminal which assign a plurality of phone numbers to single mobile phone and perform various call processing and/or responses according to a requested phone number contained in call request signal among the
10 assigned two or more mobile phone numbers.

2. Background Art

In general, telephone terminals are regarded as the most universal communication means to transceive (transmit/receive) messages that users want to send via
15 voice format. The telephone terminals are divided into a wired phone and a mobile phone terminal. The wired phone terminal is sub-divided into a corded phone and a cordless phone terminal. The cordless phone terminal refers to a phone terminal having additional portable
20 apparatus, that is, a cordless handset used for communicating with main set of a corded phone terminal.
This cordless phone terminal has a limited usable range

of telephone call due to the fact that the portable handset always has to communicate with main set of a corded phone terminal.

On the other hand, the mobile phone terminal can
5 directly connect to telephone network and communicate irrespective of main set of a corded phone terminal, having broad range of telephone call. Especially, the usage of mobile phone terminals has been increasing rapidly because telephone call service of good quality
10 and various value-added services is provided with recent development of communication technology.

By the way, aforementioned mobile phone terminal has a unique phone number assigned to itself such that it can be distinguished from each others. In addition, the
15 available spare frequency band which will be allocated to new mobile communication system is dramatically decreasing due to the rapidly increasing usage of mobile phones.

Therefore, the conventional communication schemes such
20 as FDMA (Frequency Division Multiple Access) and TDMA (Time Division Multiple Access) are being replaced with a new communication scheme that can make more efficient use of the given frequency band, that is to say, CDMA (Code Division Multiple Access), which recently has been

proposed by Qualcomm Inc.

However, the conventional mobile phone service has some drawbacks. Firstly, a mobile phone subscriber is not allowed to have a plurality of phone numbers with single
5 phone terminal, so that he or she has only single phone number on single mobile phone. Therefore, users who want to have plural phone numbers have no choice but to purchase the same number of mobile phone terminals, giving subscribers economic burden and much inconvenience.
10 Secondly, a callee with single mobile phone can not identify a caller, which makes the callee respond to the caller without having an idea of who is calling and may give subscribers a mental burden. In addition, a callee can not figure out if the received call is emergent or
15 not, making it difficult to promptly respond to a emergency call.

So, in order to mitigate the economic burden that the multiple mobile phone terminals must be purchased, several conventional arts have already been proposed in
20 Korea patent publication No. 96-16879 and Korean patent preliminary publication No. 97-705315.

However, even though the conventional arts have proposed a method for assigning a plurality of phone numbers to single mobile phone terminal, all of the

plural phone identification information (numbers) in the proposed conventional arts are independent subscriber phone numbers which can be assigned to and used for other phone terminal users and they are all assigned to single
5 subscriber who has joined mobile phone service. Therefore the conventional arts fail to provide method for using the limited frequency band more efficiently. In addition, the conventional arts do not present appropriate call response and call processing methods for using plural
10 phone numbers in mobile phone terminals.

Seeing from the viewpoint of power consumption, which is very important in mobile phones because the installed battery is of small quantity, the conventional arts also has a disadvantage of consuming much power due to the
15 process of continuous communication with mobile phone base station for a instant paging/accessing, that is, periodically transmitting a plurality of phone terminal identification information corresponding to the assigned plural subscriber phone numbers to inform mobile phone
20 system of mobile phone's position and status. This results in rapid increase of power consumption needed for communicating with base stations in standby mode, hence reducing battery operation time dramatically.

3. Disclosure of Invention

It is an object of the present invention to provide a mobile phone system and a mobile phone terminal using a plurality of telephone numbers. A plurality of telephone
5 numbers are assigned to single mobile phone terminal such that the limited frequency band can be utilized efficiently. Call response and call processing can be performed differently according to called phone numbers, each number is correspondent to each assigned plural
10 telephone numbers respectively.

It is another object to provide a voice mailing service of storing voice messages separately according to plural phone numbers and identifying pre-stored voice messages distinguishably for all of the plural phone numbers.

15 The mobile phone system in accordance with the present invention, which has been proposed to achieve the mentioned objectives, firstly information on called part, that is, telephone number is extracted from a received call request signal and then whether or not the call
20 request signal is associated with a mobile phone terminal which has joined multiple phone numbers service is checked based on the extracted telephone number. If the telephone number is for plural telephone number service, the phone terminal identification information and phone

number identification information which are corresponding to the called telephone number are extracted, the phone number identification information discriminating plural telephone numbers. And then, the call request is
5 processed complying with the extracted identification information. As a result of the call processing, the phone terminal identification information or phone number identification information is extracted from a call connection request signal received from a switching node
10 via radio at the side of mobile phone terminal, and a mobile terminal may respond to the call connection request differently based on the extracted the phone terminal identification information or phone number identification information and display the extracted
15 information.

The mobile phone system and terminal according to the present invention has many advantages. Firstly, subscribers can use multiple phone numbers with single mobile phone. Secondly, subscribers can take versatile
20 call processing, call response and voice mailing service in accordance with the multiple phone numbers. Thirdly, battery power consumption which is needed for communicating with mobile base station in standby mode can be minimized.

4. Brief Description of Drawings

The accompanying drawings, which are included to provide a further understanding of the invention, illustrate the preferred embodiment of this invention, and together with the description, serve to explain the principles of the present invention.

In the drawings:

FIG. 1 shows a typical block diagram of general mobile phone network;

10 FIG. 2 shows a block diagram of a mobile switching node in accordance with the present invention;

FIG. 3 describes CDMA mobile phone code channels;

FIG. 4 shows a block diagram of a mobile phone terminal in accordance with the present invention;

15 FIGS. 5A and 5B are flow charts for describing the operation of a mobile phone system in accordance with the present invention;

FIGS. 6A and 6B are flow charts for describing call processing methods of mobile switching node in accordance
20 with the present invention;

FIGS. 7A and 7B are flow charts for describing call responding methods of a mobile phone terminal in accordance with the present invention; and

FIG. 8 is a flow chart for describing voice mailing

procedures of a mobile phone system in accordance with the present invention.

5. Modes for Carrying out the Invention

The preferred embodiments of the present invention will be described hereinafter in detail referring to the accompanying drawings.

FIG. 1 depicts a conceptual representation of the mobile phone network using a plurality of phone numbers, which includes a telephone communication network 2 linked with multiple telephones 1, a telephone network interface unit 3 connected to the wired and/or wireless telephone communication network 2, a mobile phone controller 4 performing a call processing according to a call request signal received via the telephone communication interface unit 3, a data storage unit 5 storing data necessary for call processing of the mobile phone controller 3, and mobile phone base stations 6 sending the call-processed signal to a mobile phones via radio.

FIG. 2 shows a more detailed block diagram of mobile switching node Sx including functional blocks of the telephone network interface unit 3, the mobile phone controller 4, and the data storage unit 5.

FIG. 2 depicts sub-blocks of a telephone network interface unit 11 transceiving call signal and voice

signal with being linked to the wired and/or wireless telephone communication network 2, a hard disk 14 storing telephone identification information contained in a call request signal and call processing data corresponding to
5 the telephone identification information, a database 20 where voice message and guiding message are stored in digital data format, an ADPCM unit 19 which performs adaptive differential quantization of voice signal into voice digital data, a voice conversion unit 18 which
10 transforms the digital data stored in database into voice signal, a DTMF processor 12 which interprets dual tone multiple frequency (DTMF) signals received from the telephone network interface unit 11, a controller 13 which generates control signals in accordance with the
15 DTMF signal, a call processing unit 15 which generates a call connection request signal in accordance with the control signals, several multiplexers 21 transmitting a call connection request signal generated from the call processing unit 15 to multiple mobile phone base stations
20 or selectively outputting signals received from mobile phone base stations, and a link interface unit 22 transmitting switched signals of the multiplexers 21 to another mobile switching node.

The operation of mobile switching node Sx of FIG. 2

will now be described in detail with reference to the accompanying drawings

FIG. 3 shows mobile phone code channels of CDMA system to which the embodiment of the present invention is applied.

The conventional CDMA signal uses 64 code channels consisting of 1 pilot channel, 1 sync channel, 7 paging channels, and 55 traffic channels.

The pilot channel transmits an unique non-modulated signal generated by mobile phone base station, which will be used for discriminating cell or sector of the mobile phone base station. The sync channel is used for synchronization of a mobile phone to a base station.

The paging channels are used for mobile phone base station to call a mobile phone and the traffic channels are used for transceiving voice messages of a mobile phone responded to the call. The paging channels also have information with which the phone number requested by a caller can be recognized. The paging channels in accordance with the present invention contain a phone terminal identification information for indicating the called mobile phone and plural phone number identification information for discriminating plural phone numbers used by the requested mobile phone.

Now, the operation of the mobile switching node Sx is explained. Upon receiving a call request signal via the telephone interface unit 11, the controller 13 detects a phone terminal identification information contained in
5 the call request signal and checks if the requested mobile phone has joined a service using a plurality of phone numbers. If the phone terminal identification information is associated with a mobile phone using a plurality of phone numbers, the controller 13 extracts
10 associated phone number identification information and performs call processing such as sending call connection request signal corresponding to the extracted phone number identification information.

Meanwhile, a mobile phone 7 extracts a phone terminal
15 identification information contained in a call connection request signal received through mobile phone base station 6 from the mobile switching node Sx and checks if it corresponds to itself. If then, the mobile phone extracts a phone number identification information contained in
20 the call connection request signal and recognizes that there has been a call connection request to a phone number among a plurality of phone numbers pre-assigned to itself.

A preferred examples for recognizing the plural

telephone numbers is explained. Suppose that a phone terminal identification information used by a mobile phone, which is to be carried in the paging channels, is 8-bit length code and the mobile phone uses 4 different plural phone terminal numbers.

In such a case, the minimum number of data bit to discriminate the 4 telephone numbers assigned to a multiple number subscriber is 2 (00, 01, 10, 11). Thus, the paging channel is transmitted, which contains a phone terminal identification information of 8 bits for discriminating a requested mobile phone and a phone number identification information of 2 bits for discriminating 4 assigned telephone numbers used by a callee. the telephone numbers used by a subscriber are assigned independently of the digit values of phone number identification information since the called telephone number is translated into a phone terminal identification information and one of phone number identification information.

FIG. 4 shows the block diagram of a mobile phone terminal in accordance with the present invention, which comprises a frequency conversion unit 31 converting up/down frequency of a signal received from a mobile phone base station or a signal generated from a mobile

phone, a mod/demodulation unit 32 performing modulation/demodulation of a received signal, a protocol processing unit 33 decrypting/encrypting data for communication from the modulated/demodulated signals, a
5 vocoder 35 decoding the voice digital data to voice analog signal, an encoder 36 encoding voice analog signal to digital voice data, a microprocessor 34 controlling call response and overall operation according to the data interpreted in the protocol processing unit 33, a storage
10 unit 39 storing information needed for control of the call response and operation, a display unit 38 displaying call response status and information of call connection request, and a speaker/microphone module 37 output and input the voice analog signal.

15 The following is the detailed explanation of call processing procedures according to the present invention.

FIGS. 5A and 5B are flow charts showing the call processing procedures of mobile phone system allowing a plurality of phone numbers for single mobile phone
20 terminal in accordance with the present invention. Specifically, FIG. 5A is a flow chart of operations performed in the mobile switching node Sx, and FIG. 5B is a flow chart of operations performed in a mobile phone terminal, where the operations of mobile phone base

station is omitted.

The following explains the operation of a mobile phone system allowing a plurality of telephone numbers in accordance with the present invention.

5 When mobile switching node Sx receives a call request signal during standby mode, which means that a call request signal is received through the telephone interface unit 11 linked to the wired and/or wireless telephone communication network 2, the DTMF processor 12
10 detects dual tone multiple frequency signal contained in the received call request signal and outputs digit information corresponding the detected dual tone multiple frequency signal. Using the digit information which corresponds to a telephone number of a called mobile
15 terminal, the controller 13 checks if the called telephone number is served by the mobile switching node Sx itself and if it is associated with plural telephone number service. The checking process is performed by searching the hard disk 14 containing the subscribers'
20 service information.

If it is a telephone number for a subscriber who uses plural telephone numbers, the controller 13 extracts phone terminal identification information related to the requested telephone number from the subscribers' service

information or the call request signal if provided, and then transmits a phone number identification information corresponding to the requested telephone number to the call processing unit 15 (S13) together with the phone
5 terminal identification information, a phone number identification information being stored in the hard disk 14 in connection with the extracted phone terminal identification information. The call processing unit 15 generates a call connection request signal containing
10 both the phone terminal identification information and phone number identification information, based on the call request from the controller 13, and transmits it to one of the multiplexers 21 linked with mobile phone base stations, making the call connection request signal be
15 sent to a mobile phone (S14).

Meantime, upon receiving (S31) the call connection request signal through mobile phone base station during standby mode (S30), a mobile phone terminal detects a phone terminal identification information contained in
20 the call connection request signal and checks if itself is requested. Considering these procedures more specifically, the frequency conversion unit 21 converts a signal received from a base station via antenna into a intermediate frequency signal and then into baseband

signal. The mod/demodulation unit 32 demodulates the baseband signal into digital signal.

The protocol processing unit 33 interprets the demodulated digital signal into decrypted data from which
5 the microprocessor 34 extracts the phone terminal identification information. Then, the microprocessor 34 checks whether or not the extracted phone terminal identification information corresponds to its own identification information pre-stored in the memory 39.
10 If the extracted phone terminal identification information corresponds to its own one, the microprocessor 34 extracts a phone number identification information from the decrypted data interpreted by the protocol processing unit 33, and reads out data of call
15 response preset for the extracted phone number identification information from the memory 39.

After then, the microprocessor 34 checks what type of response mode the read data of call response indicates. If the read data of call response indicates a normal call
20 responding mode, the microprocessor 34 retrieves and checks an alert data for call arrival associated with the extracted phone number identification information which has been stored in the memory 39, and controls the alerting device, which may be the microphone 37 or the

display unit 38, to output alerting signal corresponding to the read alert data. For example, if the alert data for call arrival indicates sound, an alerting signal can be either "bee-bee" or "too-too" sound according to the
5 phone number identification information, so that the type of alerting sound enables a callee to recognize a called telephone number directly and immediately.

As another example, if an alert data for call arrival is vibration, a callee can distinguish a called telephone
10 number by recognizing the period or magnitude of vibration pre-specified according to the phone number identification information. In a case that an alert data for call arrival is set to a lamp such as light emitting diode (LED), a called telephone number can be
15 discriminated by a callee based on the brightness or on-and-off period of a lamp in the display unit 38 since the brightness or the on-and-off period is differently preset according to each of the phone number identification information. In a case that an alert data for call
20 arrival is set to characters, a called telephone number can be discriminated by a callee based on alerting characters showing the phone number identification information in direct as displayed in the display unit 38.

After alerting the call arrival, if there enters a key

through a keypad unit 41 (S37) to accept the call connection request, a call response signal responding to the call connection request signal is sent to any mobile phone base station (S38), thereby a call connection can
5 be established.

The operation for call connection is explained in more detail. If a predetermined key such as a "SND" key on the keypad unit 41 is entered, the microprocessor 34 detects the key-in and then controls the protocol processing unit
10 33 to generate a call response data. The call response data generated in the protocol processing unit 33 is modulated into a call response signal by the mod/demodulation unit 32 and again are converted to a high-frequency signal by the frequency conversion unit 31,
15 being transmitted via radio.

The call response signal is transmitted to mobile switching node Sx via mobile phone base station. The mobile switching node Sx receives the call response signal and checks if the received call response signal is
20 based on conditional or unconditional call connection (S17). If the call response signal indicates unconditional-based, then the controller 13 of mobile switching node Sx controls the switching unit 16 and the multiplexer 21 to setup a connection between a caller and

a callee.

If the mobile phone terminal gets a keypad signal of ending call connection from the keypad unit 41 while connection is setup, the mobile phone terminal transmits
5 a call disconnection signal to the mobile switching node Sx via mobile phone base station. Upon receiving the call disconnection signal (S19), the mobile switching node Sx disconnects the signal path between caller and callee (S40) and enters standby mode (S20), thereby the mobile
10 phone terminal also goes back to standby mode (S41).

Meanwhile, the steps S22 and S42 of FIG. 5A and 5B representing conditional call connection processes a requested call in different ways according to call response data of a mobile phone terminal or call
15 processing data of the mobile switching node Sx1.

The conditional call connection can be performed independently in either a mobile phone terminal or a mobile switching node depending upon which is easier to embody. Several examples of conditional call connection
20 are explained as follow referring FIGS. 6A, 6B, 7A, and 7B.

FIGS. 6A and 6B show examples that a conditional call connection is processed in mobile switching node Sx independently of mobile phone terminal. At first, the

controller 13 searches for a phone terminal identification information corresponding to a called telephone number contained in a received call request signal (S51) during standby mode (S50), and, if
5 discovered, checks whether the discovered phone terminal identification is associated with a mobile phone terminal having plural telephone numbers. If then, the controller 13 also navigates the hard disk 14 to find phone number identification information corresponding to telephone
10 number which current call is requested to.

The controller 13 reads out call processing information stored in connection with the found phone number identification information in hard disk 14 and checks whether the read call processing information indicates
15 call rejection or not. If the call processing information indicates call rejection, guiding message data having been stored in the database 20 in format of digital compressed data are retrieved. The retrieved guiding message data are restored to voice analog signal by the
20 voice conversion unit 18, and transmitted to the caller, notifying that the request call has been rejected.

In addition, as for the guiding messages corresponding to the call rejection, it is more desirable to adopt indirect and polite expression rather than announcement

expressing call denial directly so that a caller may not feel unpleasant. For example, a guiding message can be like this, "it is impossible to connect the requested subscriber now because the mobile phone has been powered-
5 off, please call it again later". Such a expression can lead the caller not to recognize that the requested subscriber is rejecting his or her call.

If the call processing information stored in connection with the found phone number identification information
10 indicates time-conditional call (S57), the controller 13 detects current time (S58) and compares it with call restriction time or call connection time which is preset by a subscriber's request (S59). If the current time is within the preset call restriction time, a guiding
15 message representing the above expression is retrieved and transmitted to the caller, and if the current time does not belong to the call restriction time, normal call processing operation such as transmitting a call request signal is accomplished, which has been described
20 hereinbefore.

If the call processing information stored in connection with the found phone number identification information indicates call routing to voice mailing system (S70), a guiding message informing that the request call is re-

routed to voice mailing system is transmitted (S71) and the conventional voice mailing service is provided after connection to the voice mailing system is established (S72). In case that the voice mailing system is united to
5 a mobile switching node as shown FIG. 2, analog voice signal received through the telephone network interface unit 11 is converted into digital data by the ADPCM unit 19 and is stored in connection with the extracted phone terminal identification information in the database 20.

10 If the call processing information stored in connection with the found phone number identification information indicates region-conditional call (S74), the controller 13 detects current location (S75) by interpreting the pilot and/or paging channel signal from neighboring
15 mobile base station, and compares current location with call restriction region which is preset by a subscriber's request (S75). if the detected current location is within the preset call restriction region, a guiding message refusing call connection is transmitted and again standby
20 mode is sustained (S73).

In cases of the call restriction, time-conditional call connection, and region-conditional call connection, the requested call can be rejected such a way that a guiding message refusing call connection is replaced with a voice

menu message of voice mailing service and the request call is unconditionally re-routed to a voice mailing system.

FIGS. 7A and 7B are flow charts for showing how to respond a call connection request response according to the type of conditional call connection in a mobile phone terminal. When a call connection request signal from a mobile switching node is received in standby mode (S81), a phone terminal identification information is extracted from the received call connection request signal (S82). Then, mobile phone terminal checks if the call connection request signal is destined to its own terminal, if then, a phone number identification information contained in the call connection request signal is extracted too (S83).

15 The microprocessor 34 of mobile phone terminal reads out the data of call response stored in connection with the extracted phone number identification information from the memory 39 and checks whether the read data of call response indicates call rejection or not. If it is

20 call rejection, the mobile phone terminal sends call response signal notifying call rejection to a neighboring base station (S85) and the mobile switching node Sx connected to the base station receives the call response signal whereby the mobile switching node Sx performs the

operation of call rejection.

If the read data of call response associated with the extracted phone number identification information indicates time-conditional call, current time is
5 retrieved (S87) from a timer (not figured) or is obtained from the time information received from mobile base stations and then is compared (S89) with call restriction time or call connection time which is preset by a user's key-ins for each phone number identification
10 information. If the detected or obtained current time is within the preset call restriction time, the call response signal notifying call rejection is transmitted (S85) to a mobile base station as aforementioned.

If the read data of call response associated with the
15 extracted phone number identification information indicates call reverting to voice mailing system (S100), a call response signal to revert the call connection to voice mailing system is generated and transmitted (S101).
If the read data of call response associated with the
20 extracted phone number identification information indicates region-conditional call (S103), call responding procedure is as follows. At first, the current location of a mobile phone terminal is evaluated by detecting and analyzing non-modulated signal of pilot channel which

discriminates the cell or sector of a certain base station, and is compared with the call restriction region preset by user in connection with the phone number identification information. If the current location
5 belongs to the call restriction region, the call response signal to reject the call connection request is transmitted (S101) and again standby mode is sustained (S102).

If the read data of call response associated with the
10 extracted phone number identification information indicates user-conditional call response (S107) in which a user decide how the call connection request to be processed, an alert information on call arrival stored in connection with the phone number identification
15 information is retrieved from the memory 39 and an alert signal of call arrival assigned by the retrieved alert information on call arrival is generated (S108). After then, if a user presses a key to select call response mode (S109), call response processing is performed
20 according to the user's selection (S110). The user can select 'call connection', 'call rejection', or 'conditional connection' by pressing corresponding key. For example, if the user selects a time-conditional call connection, a mobile phone terminal performs above-

mentioned procedures of time-conditional call connection, that is, it detects current time, comparing the current time with call restriction time, and requesting call connection or call rejection to a mobile switching node.

5 In a case of refusing call connection according to 'call restriction', 'time-conditional call connection', 'call reverting', and 'region-conditional call connection', the alert operation of call arrival described above, for example alarm sound or phone
10 vibration, according to the call alerting information stored in connection with each phone number identification information can be omitted.

Considering the communication between a mobile phone and a corresponding base station for the present
15 invention, it is enough to send only a common phone terminal identification information in standby mode in order to notify neighboring base stations of the location of a mobile phone terminal since plural telephone numbers used by a subscriber can be recognized from a common
20 phone terminal identification information and plural phone number identification information being different with each other. Therefore power consumption needed for transmitting information in standby mode can be reduced.

FIG. 8 shows a flow chart for a method of voice mailing

service in a mobile phone system according to the present invention. At first, upon receiving (S120) a call request signal through the telephone network interface unit 11, the controller 13 extracts a called telephone number from
5 the call request signal, searches for a phone terminal identification information corresponding to the called telephone number, and, if it discovered, checks whether a mobile phone terminal which the call request is destined to has joined plural telephone number service or not
10 (S121). If the mobile phone has joined plural telephone number service, the controller 13 also searches for a phone number identification information corresponding to the called telephone number on the subscribers' service information(S122).

15 Then, the requested call is diverted to voice mailing system according to the call processing or call response as was explained referring to FIG. 6B, or is connected to voice mailing system through a conventional connection procedure (S123), where it is checked (S124) if the
20 requested voice mailing service is voice recording or voice listening. In a case of voice recording, the controller 13 retrieves guiding message data for voice recording, which may be expression of "after bee sounds, please record your message and push the asterisk button

when the recording finishes", stored in the database 20, and the retrieved data are converted into analog voice signal by the voice conversion unit 18. After outputting a voice guiding message (S125), the controller 13 waits
5 to receive voice messages from the caller.

If voice signal is received (S126), it is quantized into compressed digital data by the ADPCM unit 19. Upon receiving a key (for example '#') confirming that voice to be recorded is finished (S127), the controller 13
10 stores the compressed digital data in the database 20 together with the discovered phone number identification information (S128).

If the requested voice mailing service is voice listening at the step S124, the controller 13 reads out a
15 guiding message data demanding the entrance of password from the database 20.

The read guiding message data like "please enter the password" is converted into analog voice signal by the voice conversion unit 18, which is then outputted (S130).
20 After then, if the entered password matches with a pre-stored one (S131), the controller 13 sequentially retrieves all of the voice messages recorded and all the phone number identification information stored in connection with corresponding voice messages (S132). Both

the retrieved phone number identification information and the recorded voice data are converted into voice signal by the voice conversion unit 18 and sent to a user who has requested voice listening service, so that the user
5 gets not only the stored messages but also the corresponding telephone number to which the recorded message is destined.

The above explanation specifically describes the structure and operation of a mobile phone system and
10 mobile phone terminal as an embodiment of the present invention, which use plural telephone numbers being a combination of a phone terminal identification information and plural phone number identification information. However, this is only a preferred embodiment
15 of the present invention, therefore the present invention can be further extended, if necessary, to a mobile phone system and a terminal that use plural phone terminal identification information in order to use plural telephone numbers. In such a embodiment, diverse call
20 processing, call response and voice mailing service suggested by the present invention also can be done successfully.

CLAIMS

1. A mobile phone terminal using a plurality of telephone numbers, comprising:

a first means for demodulating a received call connection request signal into digital data;

a second means for extracting a phone terminal identification information and a phone number identification information from the demodulated data; and

a third means for outputting a signal of call arrival corresponding to the extracted phone number identification information.

2. A mobile phone terminal according to claim 1, wherein said second means compares the extracted phone terminal identification number with a pre-stored phone terminal identification number, and extracts a phone number identification information contained in the demodulated call connection request data, when the two phone terminal identification numbers are equal.

3. A mobile phone terminal according to claim 1, wherein said third means outputs call arrival sounds which are different depending upon the extracted phone number identification information.

4. A mobile phone terminal according to claim 1, wherein

said third means vibrates differently depending upon the extracted phone number identification information.

5. A mobile phone terminal according to claim 1, wherein said third means displays an LED differently depending upon the extracted phone number identification information.

6. A mobile phone terminal according to claim 1, wherein said third means displays call arrival characters which are different depending upon the extracted phone number identification information.

7. A mobile phone terminal using a plurality of telephone numbers, comprising:

a first means for demodulating a received call connection request signal into digital data;

a second means for extracting a phone terminal identification information contained in the demodulated data; and

a third means for outputting a signal of call arrival corresponding to the extracted phone terminal identification information.

8. A mobile phone terminal according to claim 7, wherein said third means outputs call arrival sounds which are different depending upon the extracted phone terminal identification information.

9. A mobile phone terminal according to claim 7, wherein

said third means vibrates differently depending upon the extracted phone terminal identification information.

10. A mobile phone terminal according to claim 7, wherein said third means displays an LED differently depending upon the extracted phone terminal identification information.

11. A mobile phone terminal according to claim 7, wherein said third means displays call arrival characters which are different depending upon the extracted phone terminal identification information.

12. A call responding method of a mobile phone terminal using a plurality of telephone numbers, comprising the steps of:

(a) demodulating a received call connection request signal into digital data;

(b) extracting a phone terminal identification information and a phone number identification information from the demodulated data; and

(c) determining how to respond to the call connection request based on the extracted phone number identification information.

13. A call responding method of a mobile phone terminal using a plurality of telephone numbers, comprising the steps of:

(a) demodulating a received call connection request signal into digital data;

(b) extracting a phone terminal identification information from the demodulated data; and

(c) determining how to respond to the call connection request based on the extracted phone terminal identification information.

14. A call responding method according to claim 12 or 13, wherein said step (c) comprises the steps of:

reading out data of call responding method stored in connection with the extracted phone terminal identification information;

checking if the read data of call responding method indicates call rejection; and

transmitting a call rejection signal to a base station based on said checked result.

15. A call responding method according to claim 12 or 13, wherein said step (c) comprises the steps of:

reading out data of call responding method stored in connection with the extracted phone terminal identification information;

checking if the read data of call responding method indicates call reverting to a voice mailing system; and

transmitting a call reverting signal to a base station

based on said checked result.

16. A call responding method according to claim 12 or 13, wherein said step (c) comprises the steps of:

reading out data of call responding method stored in connection with the extracted phone terminal identification information;

checking if the read data of call responding method indicates time-conditional call connection; and

transmitting a call connection restricting signal to a base station based on said checked result and current time.

17. A call responding method according to claim 12 or 13, wherein said step (c) comprises the steps of:

(c1) reading out data of call responding method stored in connection with the extracted phone terminal identification information;

(c2) checking if the read data of call responding method indicates region-conditional call connection; and

(c3) transmitting a call connection restricting signal to a base station based on said checked result and current location of the mobile phone terminal.

18. A call responding method according to claim 17, wherein said step (c1) transmits the call connection restricting signal based on said checked result and information identifying the base station contained in the

demodulated data.

19. A call responding method according to claim 12 or 13, wherein said step (c) comprises the steps of:

reading out pre-stored data of call responding method corresponds to the extracted phone terminal identification information;

checking if the read data of call responding method indicates user-conditional call connection; and

transmitting a call connection restricting signal to a base station based on said checked result and user's key selection.

20. A call processing method of a mobile switching node allowing a plurality of telephone numbers for single mobile phone terminal, comprising the steps of:

(a) searching a phone number identification information corresponding a called telephone number contained in a received call request signal;

(b) checking whether the phone number identification information discovered in said step (a) is associated with a mobile phone terminal using a plurality of telephone numbers; and

(c) processing the call request differently based on said checked result.

21. A call processing method according to claim 20,

wherein said step (c) comprises the steps of:

extracting data of call processing method stored in connection with the discovered phone number identification information; and

processing the call request differently based on the extracted data of call processing method.

22. A call processing method according to claim 20, wherein said step (c) comprises the steps of:

searching a phone terminal identification information corresponding to the called telephone number, the phone terminal identification information being stored in connection with the discovered phone number identification information based on the checked result; and

transmitting a call connection request signal consisting of both the discovered phone number identification information and phone terminal identification information to a mobile phone terminal.

23. A call processing method according to claim 20, wherein said step (c) comprises the steps of:

reading out data of call processing method stored in connection with the discovered phone number identification information;

checking if the read data of call processing method indicates call rejection; and

rejecting the call request based on said checked result.

24. A call processing method according to claim 20, wherein said step (c) comprises the steps of:

reading out data of call processing method stored in connection with the discovered phone number identification information;

checking if the read data of call processing method indicates call routing to a voice mailing system; and

routing the call request signal to the voice mailing system based on said checked result.

25. A call processing method according to claim 20, wherein said step (c) comprises the steps of:

reading out data of call processing method stored in connection with the discovered phone number identification information;

checking if the read data of call processing method indicates time-conditional call connection; and

restricting call connection based on said checked result and current time.

26. A call processing method according to claim 20, wherein said step (c) comprises the steps of:

(c1) reading out data of call processing method stored in connection with the discovered phone number identification information;

(c2) checking if the read data of call processing method indicates region-conditional call connection; and

(c3) restricting call connection based on said checked result and current location of a mobile phone terminal to which the discovered phone number identification information corresponds.

27. A call processing method according to claim 26, wherein said step (c3) restricts call connection based on said checked result and an identification information of a base station paging the mobile phone terminal.

28. A call processing method of a mobile switching node allowing a plurality of telephone numbers for single mobile phone terminal, comprising the steps of:

(a) searching a phone number identification information corresponding a called telephone number contained in a received call request signal;

(b) checking whether the phone number identification information discovered in said step (a) is associated with a mobile phone terminal using a plurality of telephone numbers;

(c) adding a phone terminal identification information stored in connection with the discovered phone number identification information to a paging signal and transmitting the paging signal; and

(d) processing the call request based on a signal received from the mobile phone terminal responding to the paging signal.

29. A call processing method according to claim 28, wherein said step (d) comprises the steps of:

receiving the signal responding to the paging signal;
extracting a call responding data from the received responding signal; and

processing the request call differently according to the extracted call responding data.

30. A mobile phone system allowing a plurality of telephone numbers for single mobile phone terminal, comprising:

one or more mobile switching nodes of searching a phone number identification information corresponding to a called telephone number contained in a call request signal received via telephone network, detecting a phone terminal identification information associated with the discovered phone number identification information, and processing the call request differently based on the discovered phone number identification information and/or the detected phone terminal identification information; and

one or more mobile phone terminals of extracting a phone terminal identification information and/or a phone number

identification information from a call connection request signal received via radio from one of the mobile switching nodes, and determining how to respond to the call connection request based on the extracted phone number identification information.

31. A voice mailing method allowing a plurality of telephone numbers for single mobile phone terminal, comprising the steps of:

(a) searching for a phone terminal identification information corresponding to a called telephone number received via telephone network;

(b) checking whether the phone terminal identification information discovered in said step (a) is associated with a mobile phone terminal using a plurality of telephone numbers;

(c) transmitting a guiding message for voice recording based on said checked result; and

(d) storing both a received voice message and information on the discovered phone terminal identification information in a part of database, the part of database being separated from a storage area for previous voice messages.

32. A voice mailing method allowing a plurality of telephone numbers for single mobile phone terminal,

comprising the steps of:

(a) searching for a phone number identification information corresponding to a telephone number received via telephone network;

(b) checking whether the phone number identification information discovered in said step (a) is associated with a mobile phone terminal using a plurality of telephone numbers;

(c) transmitting a guiding message for voice recording based on said checked result; and

(d) storing both a received voice message and information on the discovered phone number identification information in a part of database, the part of database being separated from a storage area for previous voice messages.

33. A voice mailing method according to claim 31 or 32, further comprising the step of transmitting via radio a signal informing that a voice message has been arrived newly.

34. A voice mailing method allowing a plurality of telephone numbers for single mobile phone terminal, comprising the steps of:

(a) searching for a phone terminal identification information corresponding to a telephone number contained

in a call request received via telephone network;

(b) checking whether the phone terminal identification information discovered in said step (a) is associated with a mobile phone terminal using a plurality of telephone numbers; and

(c) retrieving both all of voice messages and information on phone terminal identification information associated with each voice message based on said checked result, the retrieved voice messages and the information being stored in connection with the plurality of telephone numbers.

35. A voice mailing method allowing a plurality of telephone numbers for single mobile phone terminal, comprising the steps of:

(a) searching for a phone number identification information corresponding to a telephone number received via telephone network;

(b) checking whether the phone number identification information discovered in said step (a) is associated with a mobile phone terminal using a plurality of telephone numbers; and

(c) retrieving both all of voice messages and information on phone number identification information associated with each voice message based on said checked

result, the retrieved voice messages and the information being stored in connection with the plurality of phone numbers.

FIG. 1

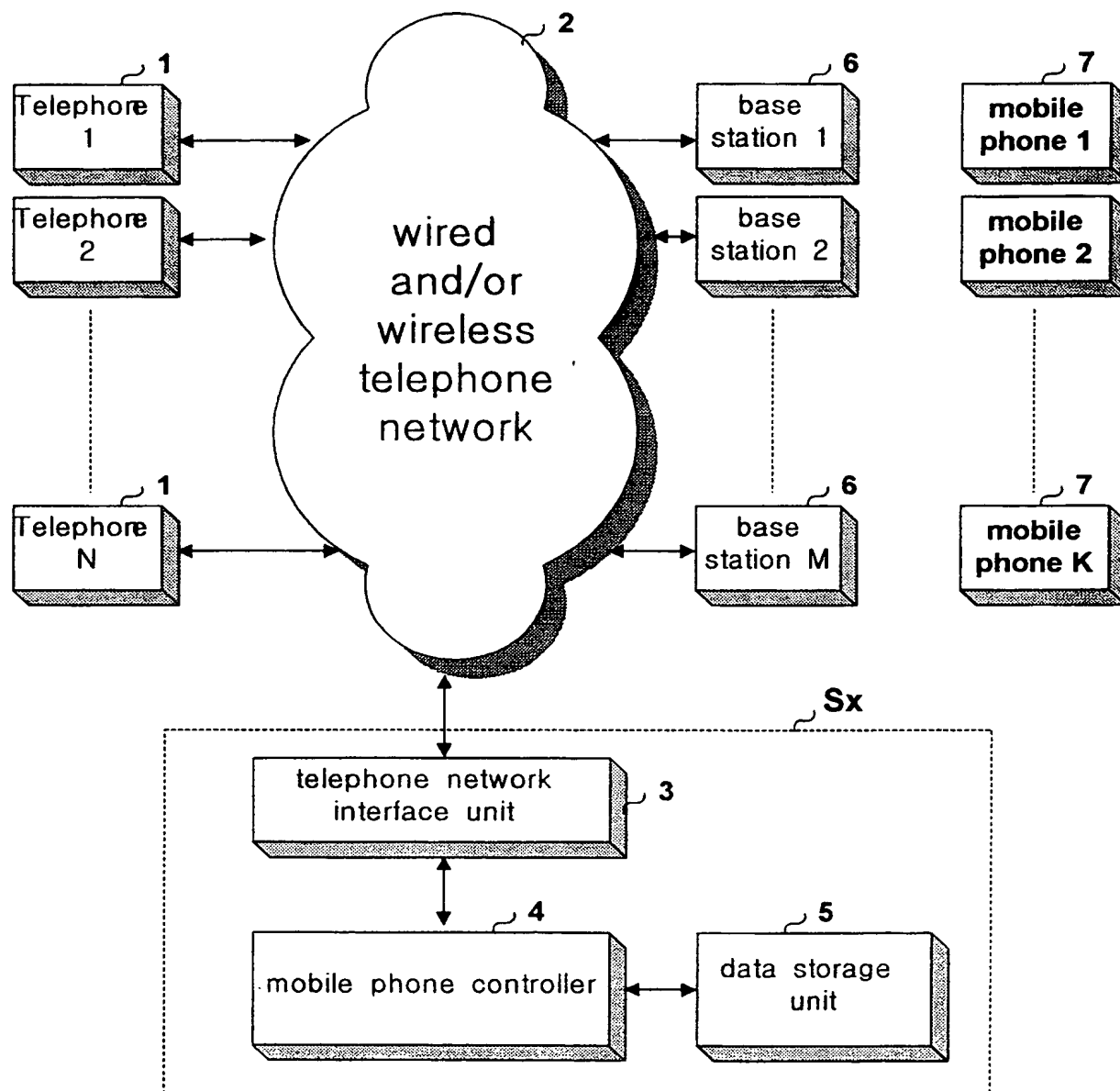


FIG. 2

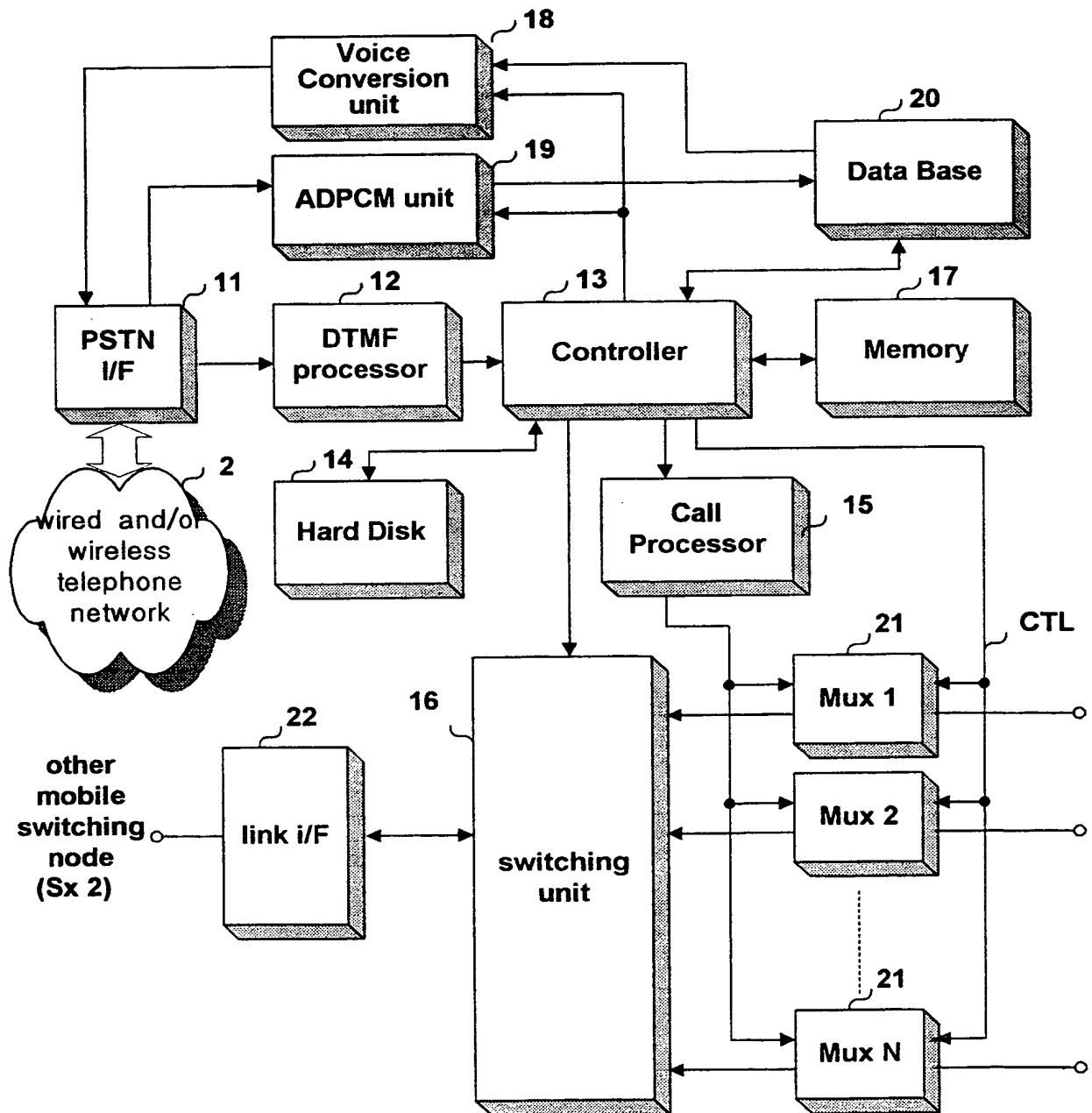


FIG. 3

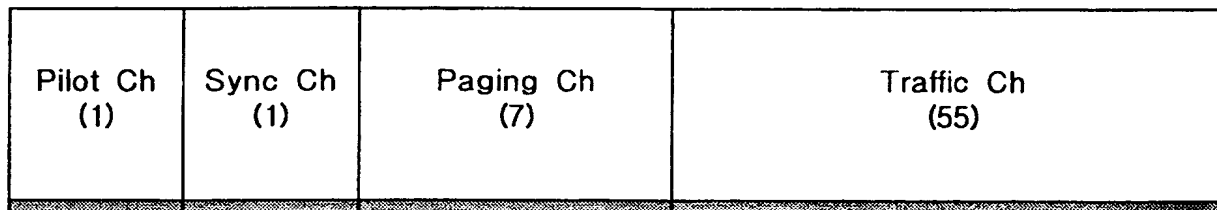


FIG. 4

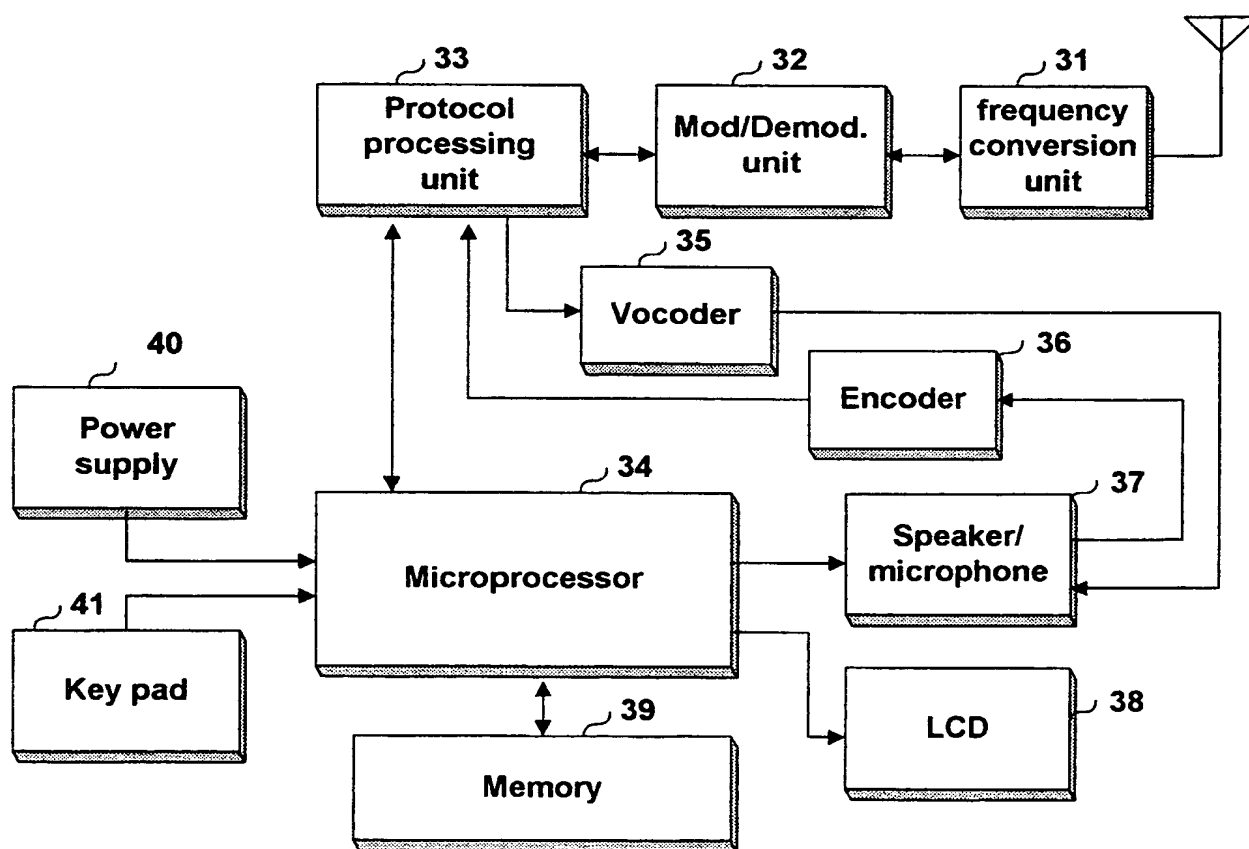


FIG. 5A

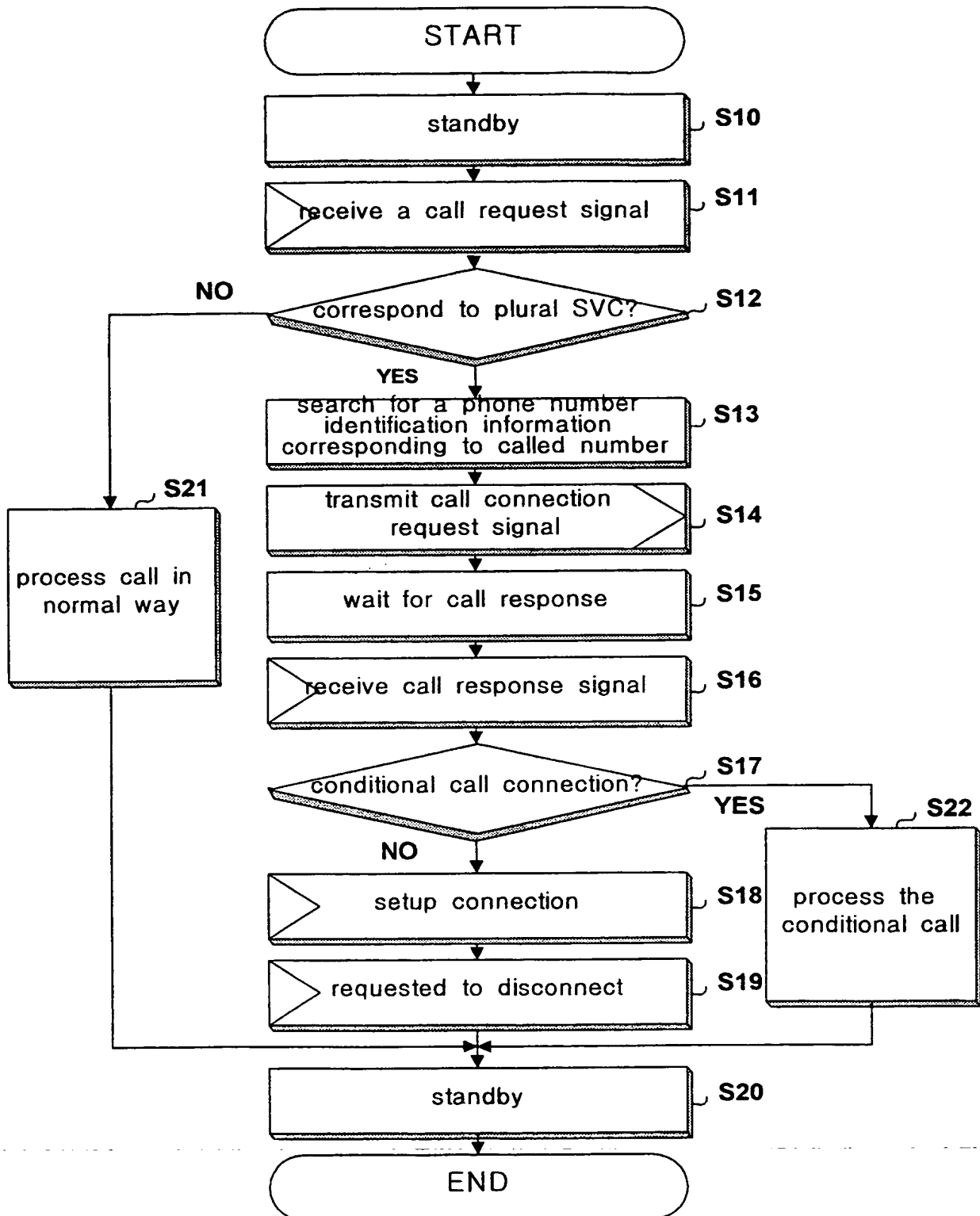


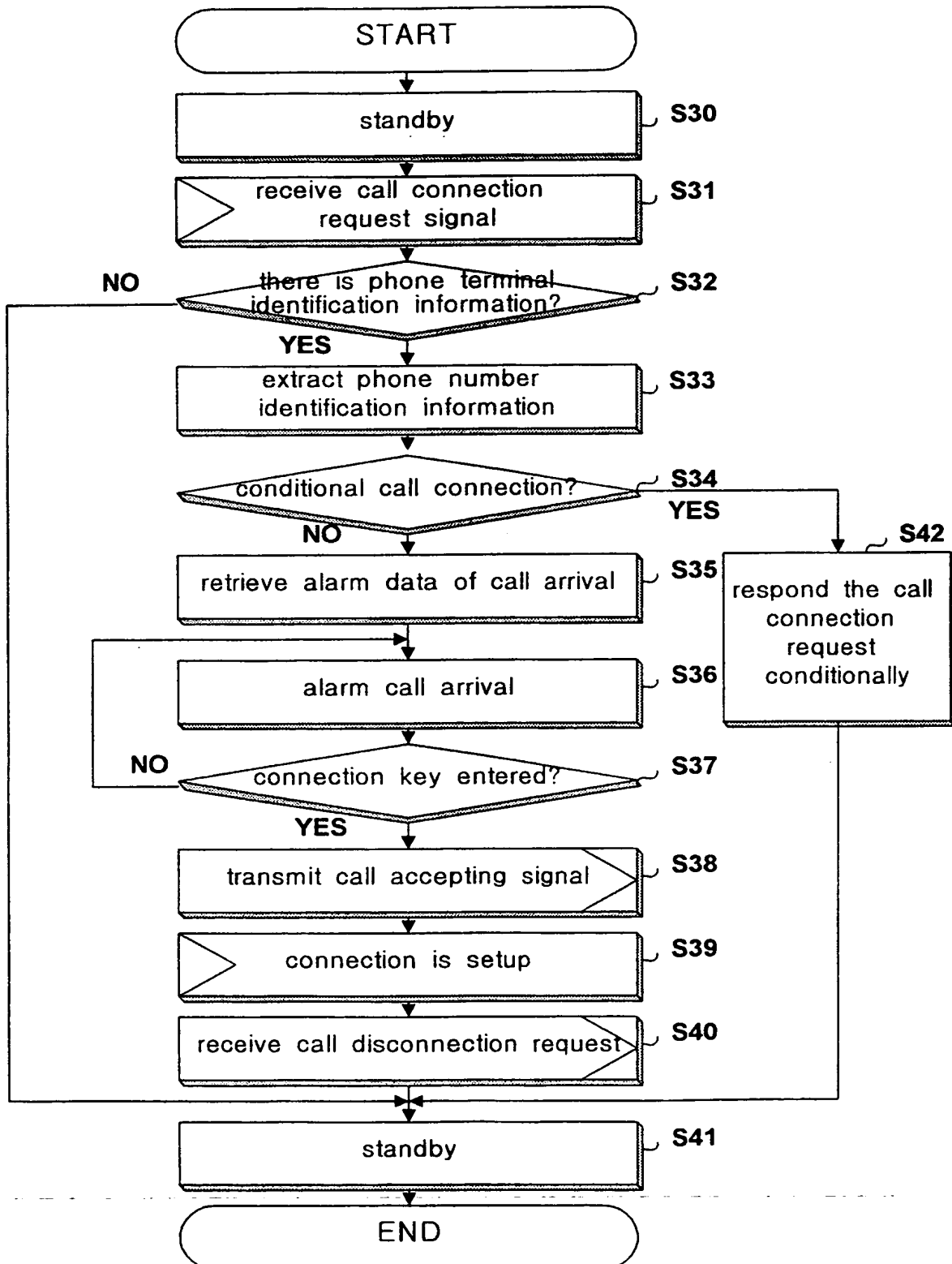
FIG. 5B

FIG. 6A

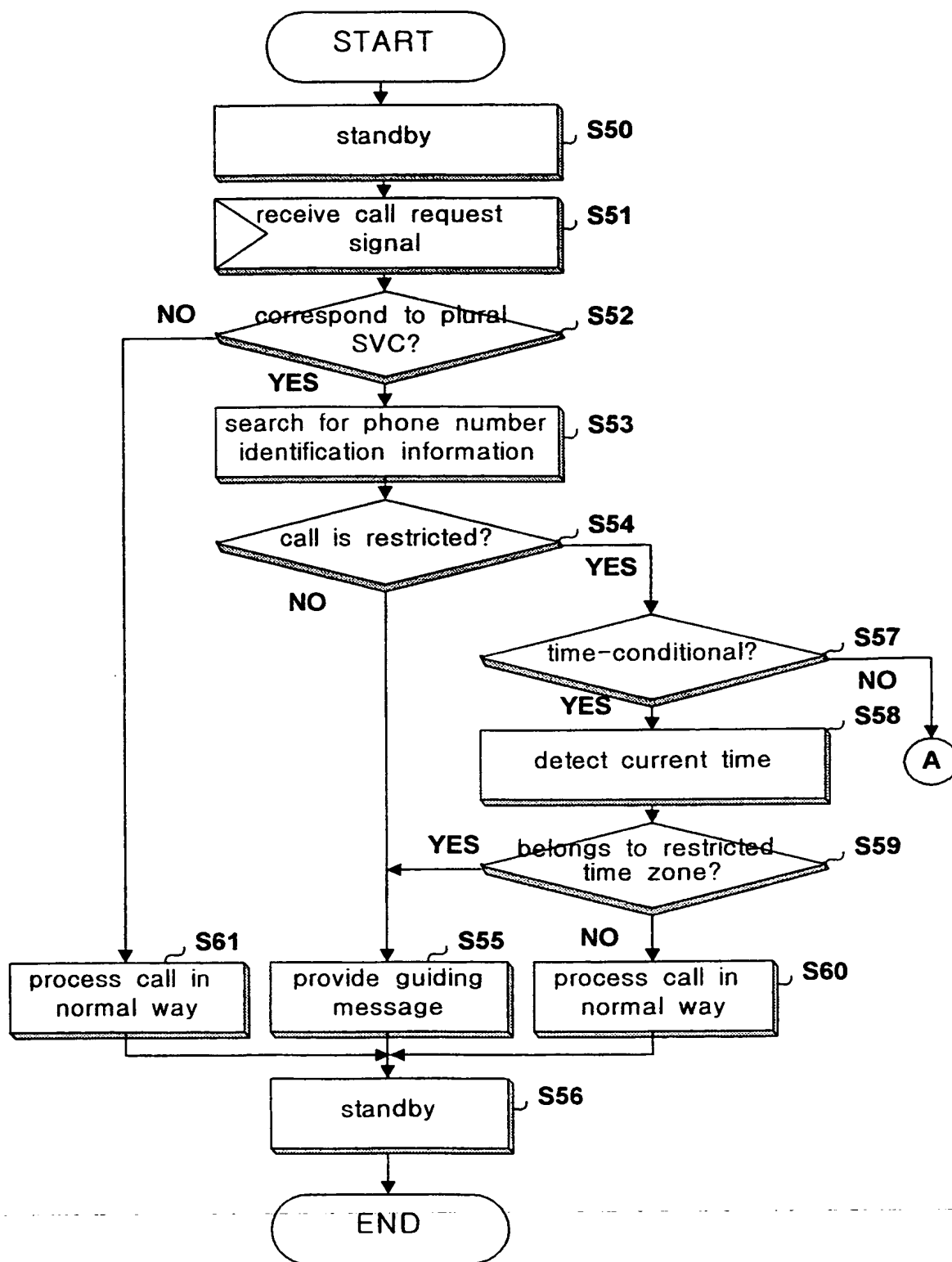


FIG. 6B

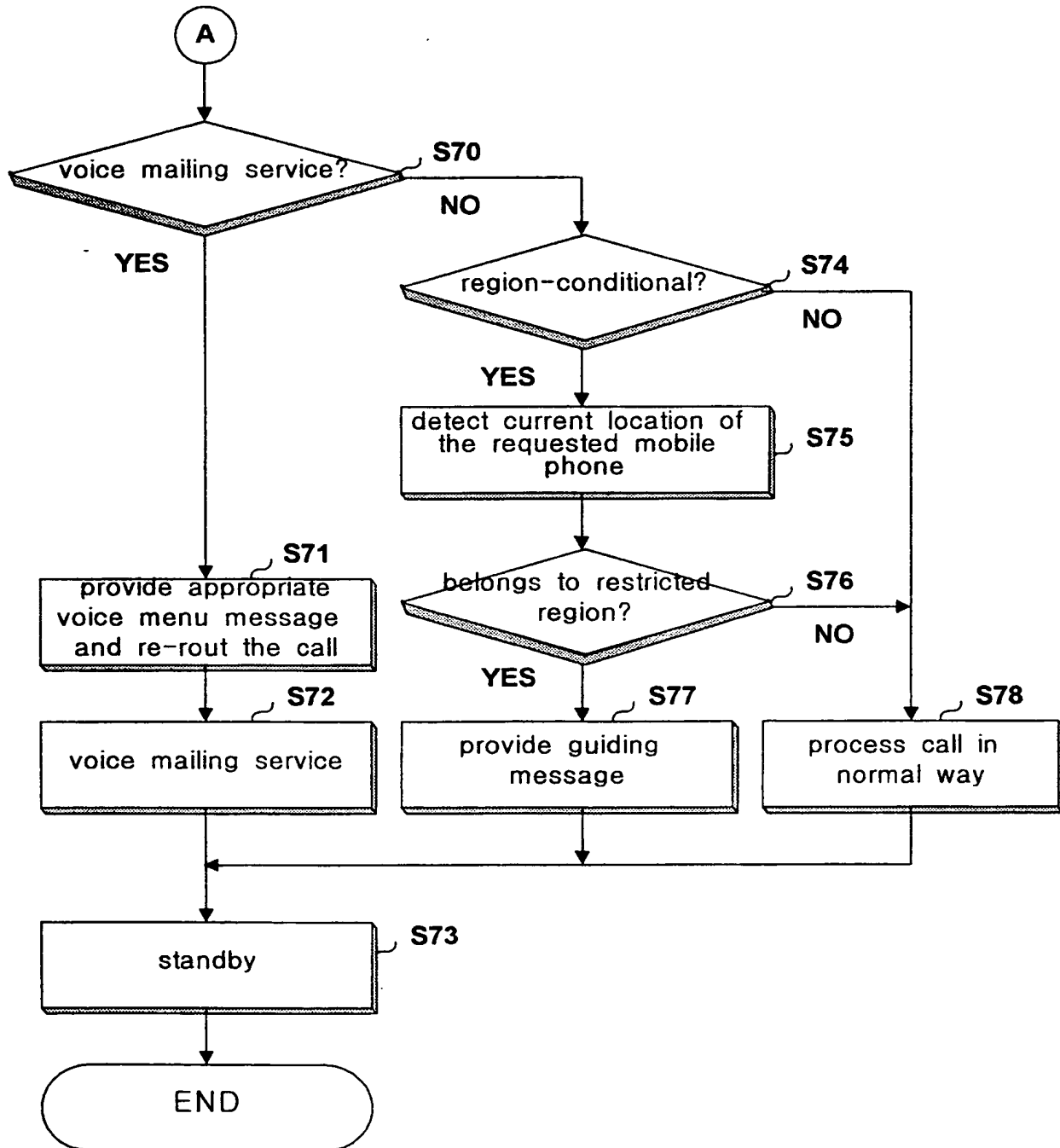


FIG. 7A

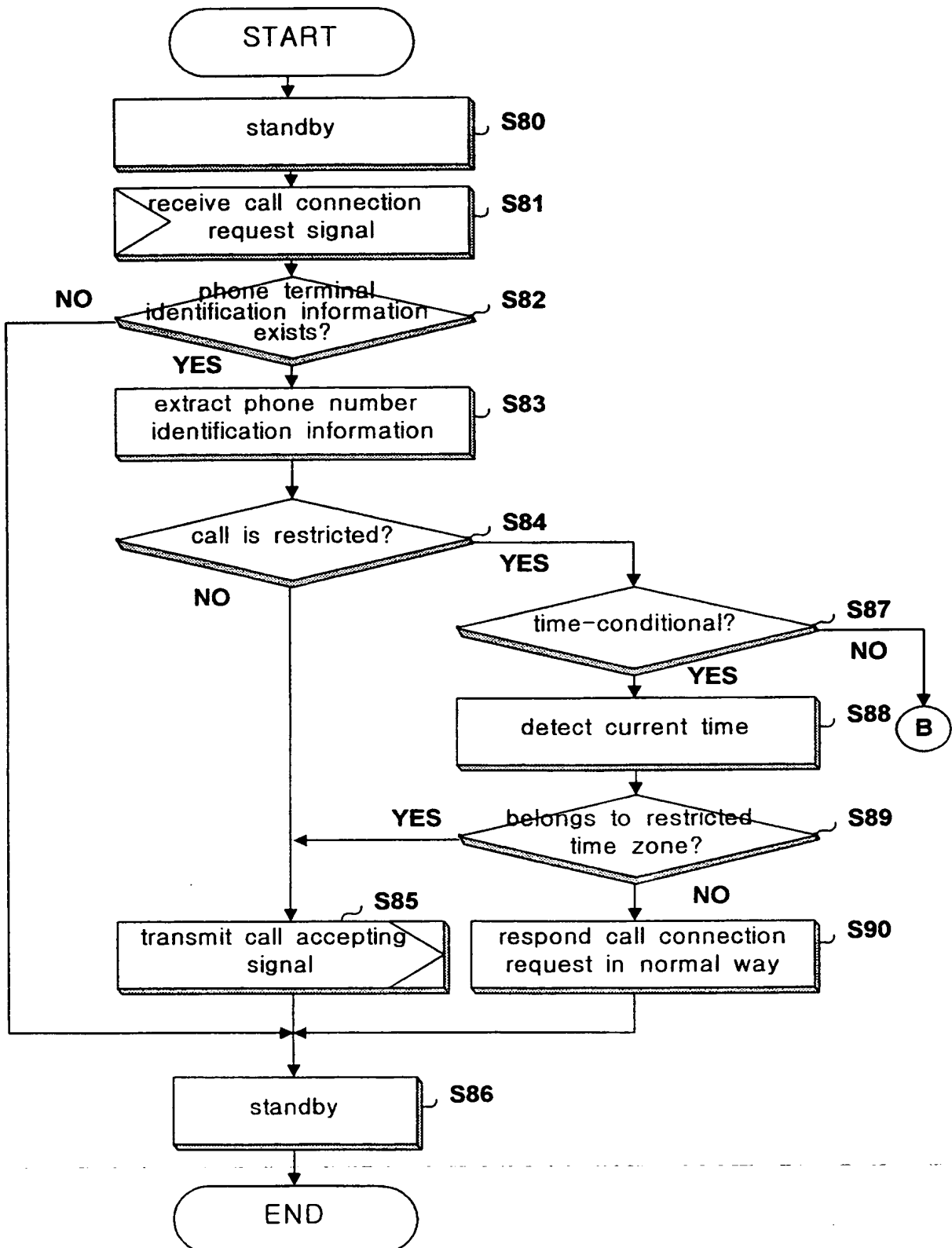


FIG. 7B

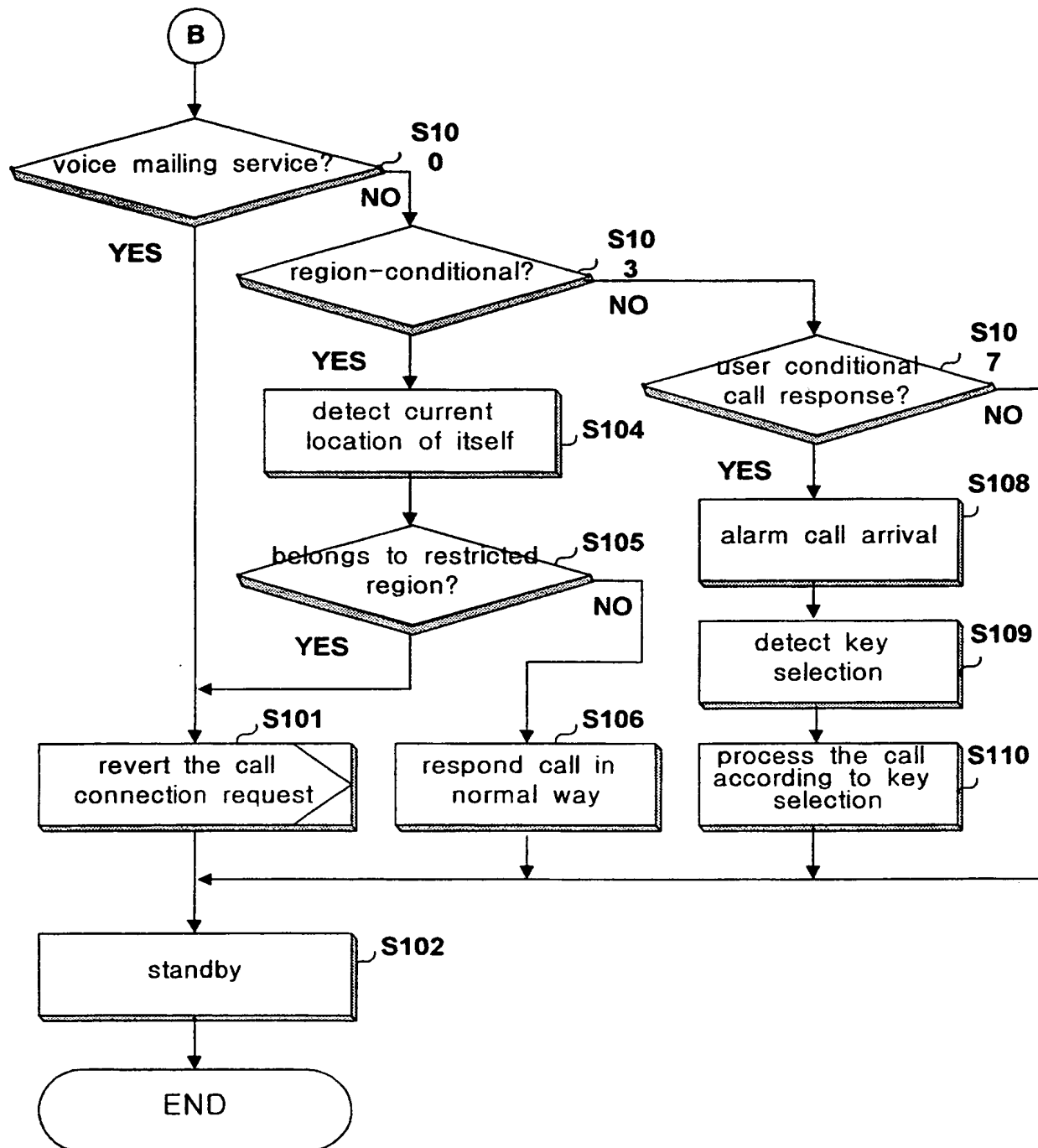
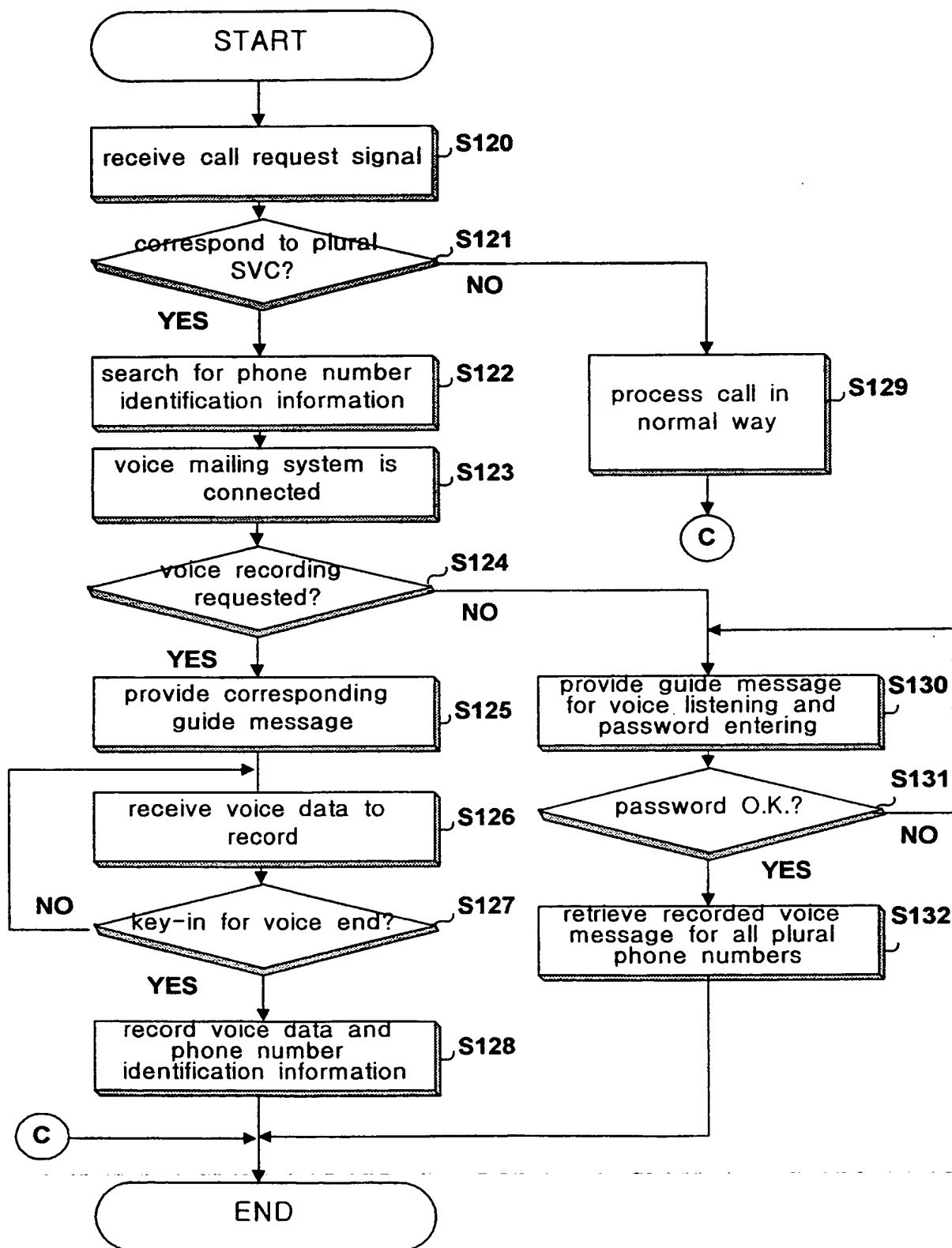


FIG. 8



(19) World Intellectual Property Organization
International Bureau

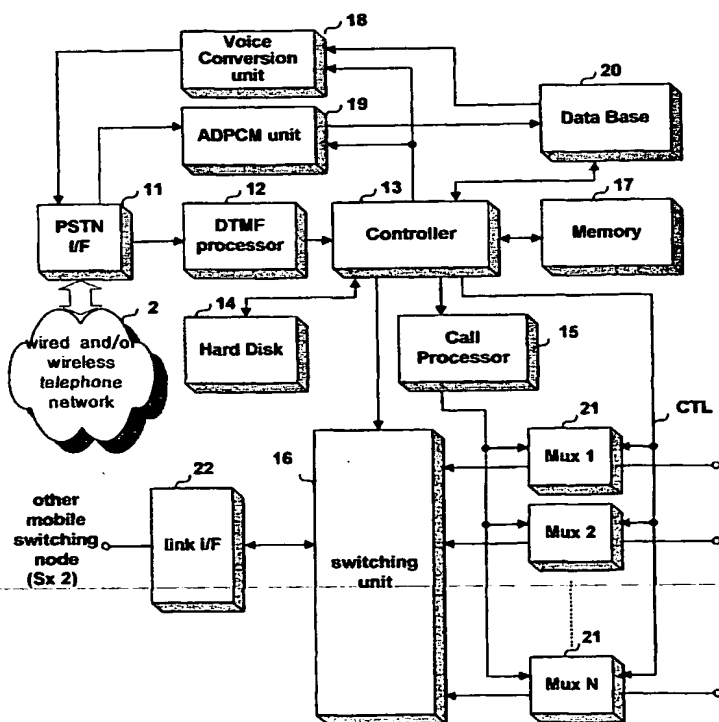


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- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data:
1998/41936 1 October 1998 (01.10.1998) **KR**
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- (75) Inventor/Applicant (for US only): **KIM, Deok, Woo [KR/KR]; 102-1303 Sungwon Apt., 4-ga, Yangpyong-dong, Youngdeungpo-gu, Seoul 151-051 (KR).**
- (54) Title: **MOBILE PHONE SYSTEM AND MOBILE PHONE TERMINAL USING A PLURALITY OF TELEPHONE NUMBERS**
- (74) Agent: **PARK, Lae, Bong; 1F., Dongun B/D, 413-4, Dogok 2-dong, Kangnam-gu, Seoul 135-272 (KR).**
- (81) Designated States (national): **AT, AU, BR, CA, CN, DE, DK, ES, FI, GB, HU, IL, JP, LU, MX, NO, PL, PT, SE, SG, US.**
- (84) Designated States (regional): **Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).**
- Published:
— With international search report.
- (88) Date of publication of the international search report:
3 May 2001
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.



(57) Abstract: The present invention relates to a mobile phone system and a terminal which assign a plurality of telephone numbers to single mobile phone. Suppose that there received a call request signal via a telephone interface unit 11. A controller 13 in mobile switching node searches for a phone terminal identification information corresponding to a called telephone number contained in the call request signal and checks whether a called mobile phone terminal uses a plurality of telephone numbers or not. If the controller 13 discovers the corresponding phone terminal identification information, it also extracts a phone number identification information associated with the called telephone number, and then corresponding call processing is performed based on the phone number identification number. Meanwhile, a mobile phone terminal extracts a phone terminal identification information contained in the call connection request signal received from mobile switching node and checks if the call connection request is for itself. If then, a phone number identification information, contained in the call connection request signal is extracted to enable a callee to recognize which telephone number is called among multiple phone numbers assigned.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 99/00595

CLASSIFICATION OF SUBJECT MATTER

IPC⁷: H 04 Q 7/38, H 04 M 3/436, H 04M 3/53

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁷: H 04 Q, H 04 M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 647 075 A2 (AT&T CORP-) 5 April 1995 (05.04.95) abstract, fig. 1; column 2, line 44 - column 4, line 57; claims 1, 2, 5, 6,	1, 2, 3, 6-8, 11
Y	10, 11, 13.	4, 5, 9, 10
Y	GB 2 314 185 A (NEC CORPORATION) 17 December 1997 (17.12.97) abstract, figs. 1, 8; page 2, line 24 - page 3, line 21, claims 1-3.	4, 5, 9, 10
X	WO 94/29992 A1 (NORTHERN TELECOM LIMITED) 22 December 1994 (22.12.94)	20-22
A	abstract, figs. 1b, 2a, 2e; page 2, line 33 - page 6, line 18; page 9, line 19 - page 12, line 9; page 15, line 3 - page 17, line 21; page 22, line 12 - page 23, line 12.	12, 13, 19, 24, 30-32, 34, 35
A	GB 2 296 409 A (NEC CORPORATION) 26 June 1996 (26.06.96) abstract, figs. 1-4; page 3, line 11 - page 5, line 24; page 14, lines 1-11.	12-14, 16, 17

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

- „A“ document defining the general state of the art which is not considered to be of particular relevance
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Date of the actual completion of the international search

12 January 2001 (12.01.2001)

Date of mailing of the international search report

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Name and mailing address of the ISA/AT
Austrian Patent Office
Kohlmarkt 8-10; A-1014 Vienna
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Telephone No. 1/53424/323

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 99/00595

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

- I. Claims 1-11, drawn to a mobile phone terminal using a plurality of telephone numbers to provide different incoming call alerting (arrival sound, vibration, LED) and to display call arrival characters which will depend upon extracted phone number identification information or extracted phone terminal identification information.
 - II. Claims 12-35, drawn to call responding methods of a mobile phone and a mobile switching node with corresponding mobile phone system and voice mailing method.
1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
 2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
 4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims: it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR 99/00595

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
EP	A2	647075	05-04-1995	CA	AA	2126477	31-03-1995
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				JP	B2	2850781	27-01-1999
				US	A	5950138	07-09-1999